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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/689,675	10/22/2003	Alfred Grill	YOR920030300US1 (20140-00)	4901
30678	7590	09/28/2006	EXAMINER	
CONNOLLY BOVE LODGE & HUTZ LLP P.O. BOX 2207 WILMINGTON, DE 19899-2207			JOHNSON, EDWARD M	
			ART UNIT	PAPER NUMBER

1754

DATE MAILED: 09/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/689,675

Applicant(s)

GRILL ET AL.

Examiner

Edward M. Johnson

Art Unit

1754

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, "the reactor chamber" lacks antecedent basis. Examiner suggests --the growth reactor--.

Claims 6 and 8, "the catalyst" and "the catalyst particles", both lack antecedent basis. Examiner suggests --the catalyst substrate--.

Claims 7 and 18 appear to contain improper Markush groups. Examiner suggests linking the members thereof with inclusive language, --and--.

Claim 17, "the process" lacks antecedent basis.

Claim 19, "the channel region" lacks antecedent basis.

***Claim Rejections - 35 USC § 102***

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3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-20 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Lee et al. US 6,350,488.

Regarding claims 1, 17, and 19, Lee '488 discloses a method for making carbon nanotubes having a diameter of a few nanometers to a few hundred nanometers by chemical vapor deposition (see abstract and column 5, lines 54-56) comprising introducing a catalyst substrate into a CVD reactor by etching, which would inherently correspond to lithographically patterning (column 2, lines 15-18), raising the temperature of the reactor to 700-1000 degrees C (column 2, lines 36-40), flowing a carbon source gas to the CVD reactor in forming the carbon nanotubes (column 2, lines 44-48), wherein the carbon source gas is acetylene and is supplied at a flow rate of 40 sccm for 10 minutes to grow nanotubes having a diameter of about 80 nm (Example 1), which would inherently correspond to controlling the residence time to control diameter.

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5. When the examiner has reason to believe that the functional language asserted to be critical for establishing novelty in claimed subject matter may in fact be an inherent characteristic of the prior art, the burden of proof is shifted to Applicant to prove that the subject matter shown in the prior art does not possess the characteristics relied upon. In re Fitzgerald et al. 205 USPQ 594.

Regarding claims 2-4, 9-10, 13-14, and 16, Lee '488 discloses the carbon source gas is acetylene and is supplied at a flow rate of 40 sccm for 10 minutes to grow nanotubes having a diameter of about 80 nm (Example 1) and controlling the pressure inside the reactor (see column 4, lines 28-33 and Examples 1 and 7-8).

Regarding claim 5, Lee '488 discloses raising the temperature of the reactor to 700-1000 degrees C (column 2, lines 36-40).

Regarding claims 6-8, 15, 18, Lee '488 discloses forming nanosized metal catalytic particles (abstract) Ni, Co, Fe, or an alloy thereof (see Embodiment 1).

Regarding claims 11-12, Lee '488 discloses argon (see column 6, lines 23-29).

Regarding claim 20, Lee '488 discloses conductivity, semiconductivity, transistors, and cathode ray tubes (see column 1, lines 20-26).

6. In the event any differences can be shown for the product of the product-by-process claims 16-20, as opposed to the product taught by Bruno '488, such differences would have been obvious to one of ordinary skill in the art at the time the invention was made as a routine modification of the product in the absence of a showing of unexpected results; see also In re Thorpe, 227 USPQ 964 (Fed.Cir. 1985).

#### **Conclusion**

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Dai et al. US 6,346,189 discloses formation of carbon nanotubes from catalyst islands comprising connecting metal lines allowing external circuitry (abstract) and patterning by e-beam lithography (see column 3), and bundles useful for field effect transistors (see column 4, lines 55-59); Kennel US 6,156,256 discloses a process for forming carbon nanofibers comprising plasma pyrolyzation in a reactor, providing catalytic particles, reduced pressure, carbon-based gas, to form the plasma in the presence of catalyst, resulting in carbon nanofibers (see abstract, Example, and claims).

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8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edward M. Johnson whose telephone number is 571-272-1352. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199

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(IN USA OR CANADA) or 571-272-1000.

A handwritten signature in black ink, appearing to read 'EMJ', is written above the typed name.

Edward M. Johnson  
Primary Examiner  
Art Unit 1754

EMJ